IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Previously Presented): A process comprising:

dimerizing an olefin mixture to form a dimerized product, and

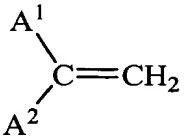
derivatizing the dimerized product to form a mixture of primary alcohols, wherein the olefin mixture comprises from 30 to 80% by weight of linear hexene isomers and at least 60% by weight of hexene isomers overall, and

wherein the dimerization is carried out with heterogeneous catalysis.

Claim 2 (Previously Presented): The process as claimed in claim 1, wherein the olefin mixture comprises a hexene isomer mixture comprising dimer propene and linear hexenes in a weight ratio of from 0.3:1 to 1:0.1.

Claim 3 (Canceled).

Claim 4 (Previously Presented): The process as claimed in claim 1, wherein dimerizing is carried out with a dimerization catalyst comprising at least one element of subgroup VIII of the Periodic Table and the dimerized product comprises less than 10% by weight of compounds which have a structural element of formula I



(I),

in which A^1 and A^2 are aliphatic hydrocarbon radicals.

Claims 5-26 (Canceled).

Claim 27 (Previously Presented): The process as claimed in Claim 1, wherein the degree of branching of the dimerized olefin mixture is from 2.0 to 3.0.

Claim 28 (Previously Presented): The process as claimed in Claim 1, further comprising

alkoxylating the primary alcohols.

Claims 29-31 (Canceled).

Claim 32 (New): A process comprising:

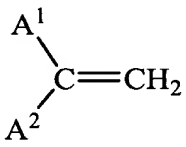
dimerizing an olefin mixture to form a dimerized product having a degree of branching of between 2.0 and 3.0, and

derivatizing the dimerized product to form a mixture of primary alcohols,

wherein the olefin mixture comprises from 30 to 80% by weight of linear hexene isomers and at least 60% by weight of hexene isomers overall, and wherein the dimerization is carried out with heterogeneous catalysis.

Claim 33 (New): The process as claimed in Claim 32, wherein the olefin mixture comprises a hexene isomer mixture comprising dimer propene and linear hexenes in a weight ratio of from 0.3:1 to 1:0.1.

Claim 34 (New): The process as claimed in Claim 32, wherein dimerizing is carried out with a dimerization catalyst comprising at least one element of subgroup VIII of the Periodic Table and the dimerized product comprises less than 10% by weight of compounds which have a structural element of formula I



(I),

in which A^1 and A^2 are aliphatic hydrocarbon radicals.

Claim 35 (New): A dimerized product prepared by dimerizing as claimed in Claim 32.

Claim 36 (New): The dimerized product as claimed in Claim 35, which comprises a proportion of branched components greater than 85%, and an unbranched olefin proportion below 15%.

Claim 37 (New): The dimerized product as claimed in Claim 36, wherein groups having (y-4) and (y-5) carbon atoms are bonded to the branching sites of the main chain of the dimerized product, where y is the number of carbon atoms in one or monomers present in the olefin mixture.

Claim 38 (New): The dimerized product as claimed in Claim 35, wherein the branched components of the dimerized product have one or two branches on adjacent carbon atoms in the region of 1/4 to 3/4 of the chain length of the main chain.

Claim 39 (New): The dimerized product as claimed in Claim 35, wherein groups having one or two carbon atoms are bonded to the branching sites of the main chain of the dimerized product.

Claim 40 (New): The dimerized product as claimed in Claim 35, wherein the branched dimerized products have a ratio of aliphatic to olefinic hydrogen atoms H_{aliph}:H_{olefin} of from 47:1 to 11:1.

Claim 41 (New): The dimerized product as claimed in Claim 35, wherein the branched dimerized products have a ratio of aliphatic to olefinic hydrogen atoms H_{aliph}:H_{olefin} of from 23:1 to 14:1.

Claim 42 (New): A surfactant alcohol prepared by the process of Claim 32.

Claim 43 (New): The surfactant alcohol as claimed in Claim 42, which has a degree of branching between 2.0 and 3.0.

Claims 44 (New): The dimerized product as claimed in Claim 38, wherein the branched components of the dimerized product have one or two branches on adjacent carbon atoms, in the region of 1/3 to 2/3 of the chain length of the main chain.

Claim 45 (New): The dimerized product claimed in Claim 36 wherein the dimerized product comprises greater than 90% by weight of branched olefins.

Claim 46 (New): The dimerized product claimed in Claim 36 wherein the dimerized product comprises less than 10% by weight of unbranched olefins.

Claim 47 (New): The process as claimed in Claim 32, further comprising:

alkoxylating the primary alcohols.

Claim 48 (New): A nonionic surfactant comprising the alkoxylation product of claim 47.

Claim 49 (New): An alkoxylation product prepared by the process as claimed in Claim 47.

BASIS FOR THE AMENDMENT

Claims 1-2, 4, 27-28 and 32-49 are active in the present application. Claims 3, 5-27 and 29-31 have been canceled. Claims 32-49 are new claims. Support for the new claims is found in the original claims. New independent Claim 32 includes dimerizing an olefin mixture to form a dimerized product having a degree of branching of greater than 2.0. Support for the limitation that the degree of branching to between 2.0 and 3.0 is found in the original specification in, for example, the Abstract wherein it is disclosed that a surfactant alcohol mixture derived from the dimerized product has a degree of branching between 2.0 and 3.0 in original Claim 13. Applicants submit that the alkoxylation product formed by derivatizing the dimerized product may inherently have the same degree of branching since alkoxylation does not necessarily change the degree of branching. The degree of branching is determined upon dimerization of the olefin monomers and not by subsequent derivatization processes.

No new matter is believed to have been added by this amendment.

REQUEST FOR RECONSIDERATION

Applicants thank Examiner Price for the helpful and courteous discussion of May 18, 2004. During the discussion, Applicants' U.S. representative presented arguments that (1), the combination of either of the Threlkel and/or Singleton references with newly cited Engelbrecht is not sufficient to render the claimed invention obvious because those of ordinary skill in the art may not apply the teachings of a heterogeneous system to a homogeneous system, and (2) the high degree of branching in the products formed by the claimed process is not inherent in the prior art compounds.

Both the Threlkel (U.S. 4,959,491) and Singleton (U.S. 5,780,694) patents which were applied by the Office in combination with newly cited Engelbrecht (U.S. 3,315,009) are drawn to processes wherein homogeneous catalysis is carried out. Threlkel discloses that the prior art process is carried out "using homogeneous dimerization catalysts" (Abstract); "typically, the polymerization is conducted as a liquid phase reaction..." (column 7, lines 7-8); "a homogeneous catalyst is also used in the second dimerization" (column 7, lines 30-31). Threlkel describes heterogeneous processes as:

> "The prior art systems using heterogeneous catalysts suffer from the usual contact problems incident to such catalysts. Moreover, the heterogeneous catalysts used by the prior art are frequently difficult and expensive to prepare" (column 2, lines 59-63).

Therefore, Threlkel explicitly discloses that the prior art process is conducted with a homogeneous catalyst and concurrently disparages heterogeneous catalysts by expressly referring to their drawbacks.

Singleton discloses that "the dimerization is generally conducted as a liquid phase reaction" (column 7, lines 51-2); and "a preferred class of catalysts used in the process are homogeneous catalysts" (column 8, lines 23-24). Singleton further discloses a number of homogeneous catalysts at column 8, line 28 through column 9, line 35.

Therefore, Singleton discloses that the prior art process is conducted with homogeneous catalysts. In contrast to both Singleton and Threlkel, Engelbrecht discloses a process which is carried out heterogeneously. The heterogeneous catalyst of Engelbrecht is "an activated carbon supported cobalt oxide catalyst" (column 1, lines 60-61; see also Claim 1, column 10, lines 5-6).

Applicants submit that a dimerization product carried out under heterogeneous catalysis conditions is mutually exclusive processes of a dimerization process carried out under homogeneous catalysis conditions. In view of the differences between homogeneous and heterogeneous catalysis and in view of the fact that present independent Claims 1 and 32 require that the dimerization is carried out under heterogeneous catalysis, Applicants submit that those of ordinary skill in the art would not have motivation or a reasonable expectation of success in combining the homogeneous processes of Singleton and Threlkel with the heterogeneous process of Engelbrecht.

Applicants therefore respectfully submit that the rejection is unsustainable and should be withdrawn.

Claim 32 is a new independent claim. New independent Claim 32 requires that the process form a product having a degree of branching of from 2.0 to 3.0. Applicants submit that if the dimerization product has a degree of branching of between 2.0 and 3.0 it cannot be obvious in view of compositions which are explicitly disclosed to have a different amount of branching.

New dependent Claims 35-41 and 44-46 are drawn to a dimerized product prepared by the dimerizing of new independent Claim 32.

Applicants submit that the subject matter of new independent Claim 32 is novel and not obvious in view of the prior art of record. The process of Claim 32 requires that the dimerized product have a degree of branching of from 2.0 to 3.0. In Engelbrecht at col. 6,

lines 32-70, it is disclosed that the prior art process provides an "dimer product...generally containing 90 to 95% by weight of dimers which are straight-chained or branch-chained containing a single substituent." It is further disclosed:

> "One of the primary advantages of the present invention is that the total dimer product of the second stage dimerization is relatively linear and as such may be used in total without additional separation steps in the preparation of..." (col. 6, lines 62-66).

Therefore, Applicants submit that the disclosure of Engelbrecht would not lead those of ordinary skill in the art to have an expectation that the process of Engelbrecht alone or when combined with the processes of either or both of Singleton or Threlkel, would provide a dimerized product having a degree of branching of from 2.0 to 3.0. Applicants note that a degree of branching of 2.0 indicates that a single linear chain has two branches and therefore has four methyl groups. The dimerized product described by the prior art chemical formula at col. 6, lines 45-47 shows only a single branch and therefore has a degree of branching of only 1.0. Further, Engelbrecht explicitly discloses that linear dimerized products are preferred (col. 6, lines 63-69).

The dimerized product of Example I of Engelbrecht is described by its composition at col. 7, lines 62-66. The prior art product contains 29.2 wt% of n-dodecene; 43.1 wt% of methyl undecenes; and 27.0% of ethyl decenes. Therefore, the dimer fraction of Engelbrecht contains 99.3% of mono-branched dimer products or linear dimer products. Applicants submit that the disclosure of Engelbrecht would not lead those of ordinary skill in the art to the presently claimed process because Engelbrecht teaches that the prior art process favors a high degree of linearity and low degree of branching whereas the presently claimed process requires a high degree of branching (a degree of branching of between 2.0 and 3.0).

Applicants therefore submit that the process of new independent Claim 32 is novel and not obvious in view of the process of Engelbrecht.

Applicants submit that any dimerized olefin mixture product prepared by the dimerizing of independent Claim 32 must have a degree of branching of between 2.0 and 3.0 because the degree of branching is set when the olefin is dimerized thereby forming a backbone having branching defined by new covalent bonds. Applicants submit that derivatizing (e.g., alkoxylating) does not change the degree of branching.

Applicants submit that a degree of branching of between 2.0 and 3.0 indicates a high degree of branching. A molecule having two branches must necessarily have four methyl groups if the molecule is a hydrocarbon derived from, for example, dimerizing hexene. If the degree of branching is greater than 2.0 then, on average, the product obtained by the dimerizing of independent Claim 32 must contain more than 4 methyl groups per molecule. Applicants submit that this degree of branching is not inherent to the products disclosed in Singleton or Threlkel. In Singleton it is explicitly disclosed that the composition prepared by dimerizing has "an average number of branches ranging from 0.9 to 2.0 per molecule" (column 3, lines 40-41). A dimerized product having a degree of branching of no greater than 2.0 cannot anticipate or be the same as a composition having a degree of branching of between 2.0 and 3.0. Applicants therefore submit that the products of Singleton do not anticipate the dimerized product formed by the process of new Claim 32.

The dimerized product described in Threlkel is not disclosed to have a specific degree of branching. However in Example 1 in column 10 of Threlkel it is disclosed that hexenes which are later dimerized consist "of a mixture of n-hexenes and methyl-pentenes" (column 10, lines 17-18). In Example 1-A it is disclosed that this product mixture is purified to prepare a composition enriched in the non-branched hexene. Nowhere is it disclosed that a degree of branching of between 2.0 and 3.0 must be obtained from the Threlkel process. In fact, as Applicants have discussed above for Singleton, dimerization of hexenes does not inherently provide a high degree of branching.

Applicants therefore submit that a product obtained from a process providing a dimerized hexene having a degree of branching of between 2.0 and 3.0 is not the same as a product obtained by dimerizing a mixture enriched in non-branched hexene.

Applicants therefore submit that the dimerized olefin mixture prepared by the process of independent Claim 32 is not anticipated by the disclosure of Threlkel or Singleton. Applicants respectfully request the withdrawal of the rejections.

Applicants submit the remarks above demonstrate the patentability of the claimed invention over the disclosure of the prior art relied upon by the Office and respectfully request the passage of all now-pending claims to Issue.

Respectfully submitted,

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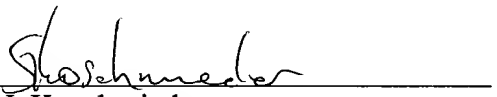

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